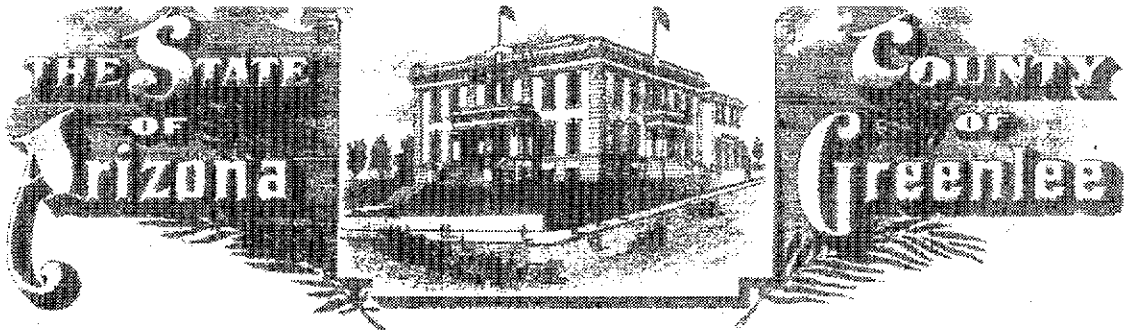

Greenlee County Airport Master Plan

(2000-2020)

Chapter 4
Facility Requirements
June, 2002

Stantec

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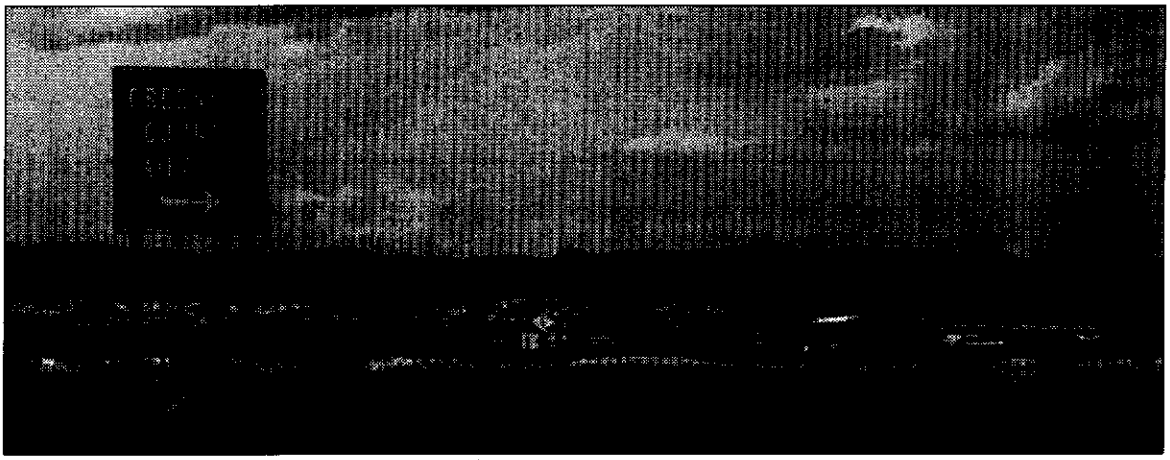
4

FACILITY REQUIREMENTS

Introduction

Airport facility requirements are identified by determining the ability of an airport to accommodate aeronautical activity based on projected demand. This is, in part, accomplished during the forecasting effort which projected aviation demand such as based aircraft and annual and peak hour operations. In this chapter, the existing airport facilities are reviewed in terms of their ability to accommodate the forecast demand. Any shortfalls are translated into physical needs such as aircraft parking and automobile parking. The planning estimates and recommendations set forth are based on guidelines established by FAA Advisory Circulars for airports.



Facility Requirements

The development of facilities is based primarily upon the characteristics of the most demanding aircraft or family of aircraft expected to use the airport. The most critical characteristics are the aircraft approach speed and wingspan of the aircraft. The planning for future aircraft use is particularly important, because design standards are used to plan separation distances between facilities that could be costly to relocate at a later date.

As discussed in Chapter 2, and consistent with FAA design criteria established *in AC 150/5300-13* change 6, Greenlee County Airport should continue to be designed to meet standards for Approach Category B and Airplane Design Group II (B-II). This chapter presents criteria used to establish facility requirements and dimensions.

The airport facility requirements for improvements at Greenlee County Airport have been separated into two categories: airside and landside. These facilities are further categorized as follows:

AIRSIDE

Runway
Taxiways
Navigational Aids
Marking and Lighting
Airspace

LANDSIDE

Hangars
Aircraft Parking Apron
Terminal Building
Fixed Based Operator (FBO)
Fueling Facilities
Aircraft Rescue & Firefighting Facilities (ARFF)
Utilities
Air Traffic Control Tower (ATCT)
Security and Fencing
Airport Maintenance

Airside Requirements

Airside facility requirements include those facilities directly related to the arrival and departure of aircraft. Identifying airside requirements primarily involves a demand/capacity analysis and a determination of facility shortfalls and sub-standard conditions based on needs and applicable FAA design standards.

Airfield Demand/Capacity Analysis

The demand/ capacity analysis considers the impact of forecast aviation activity on several critical airfield facilities. A capacity analysis was conducted for the runway to provide estimates of hourly and annual capacities for existing facilities and future levels of aviation demand. The purpose of this analysis is to determine the existing and future ability of the runway system to accommodate aircraft without significant delay and in a safe manner.

The capacity of an airport is determined by several operational factors including airfield layout, meteorology, runway use, aircraft operation mix, percent arrivals, percent touch and go's, and exit taxiway locations.

The Greenlee County Airport has a single runway configuration with no navigational aids or radar and is limited to light aircraft operations. Based on existing weather data, it is estimated that the weather conditions are 98 percent VFR and 2 percent IFR. Runway use is generally determined by surface wind conditions and airfield layout. However, County staff and airport users indicate that runway use is roughly divided 95 and 5 percent between Runway 07 and 25 for arrivals, respectively. Departures are estimated to be the reverse at 5 and 95 percent between Runway 07 and 25, respectively. In addition, 100 percent of single-engine aircraft operations at Greenlee County Airport are in Aircraft Approach Categories A and B. Touch and go operations are estimated at approximately 20 percent of local operations. This percentage is expected to remain constant during the planning period.

The airside capacity model to determine the operational capacity at Greenlee County Airport is expressed in the following three terms:

- *Annual Service Volume*
- *Weighted Hourly Capacity*
- *Annual Aircraft Delay*

Annual Service Volume

Based on the FAA airfield capacity model and published guidance, the "theoretical" annual service volume (ASV) for a single runway configuration is 230,000. However, this ASV assumes that there is a full-length parallel taxiway and adequate taxiway exits. Since Greenlee County Airport's single runway is without a full-length parallel taxiway, but has two runway exits near the mid-runway area, the actual ASV for this airport is estimated at 161,000 operations. Since total annual operations are projected to reach an estimated 8,210 over the planning period, the airport will be operating at approximately five percent of capacity by the year 2020.

Weighted Hourly Capacity

In addition to ASV, the capacity analysis involves the computation of an hourly runway capacity during VFR and IFR conditions. Based on the single runway configuration, runway utilization, lack of a parallel taxiway, and typical operating conditions at the airport, the hourly capacity for the Greenlee County Airport is estimated at 59 VFR operations and 32 IFR operations for existing Runway 07-25.

By the end of the planning period, the peak hour demand at Greenlee County Airport is forecast to reach three operations. Thus, hourly demand is well below existing capacity.

Annual Delay

Aircraft delay is expressed in terms of average delay per aircraft operation and total hours of annual delay. Delays occur to arriving traffic that must wait in the VFR pattern. Departing traffic must hold on the taxiway or the holding apron while waiting for the runway and final approach to be clear. In general, the FAA recommends consideration of development improvements to increase capacity when annual aircraft operations reach 60 percent of ASV or delays become excessive.

At present operational levels, annual delay at Greenlee County Airport is nearly non-existent. Thus, the existing airfield capacity will more than adequately serve the projected aircraft operations through 2020.

Runway Dimensions

The determination of runway length requirements for the airport is based on four primary factors.

- Critical aircraft type expected to use the airport
- Mean maximum daily temperature of the hottest month
- Runway gradient
- Airport elevation

The recommended length for a runway is determined by considering either the family or airplanes having similar performance characteristics or a specific airplane needing the longest runway. In either case, the choice should be based *on airplanes that are forecast to use the runway on a regular basis.* For planning purposes, "regular basis" is considered to be at least 500 operations a year. An analysis of the existing and future fleet mix indicates that small general aviation aircraft influences the runway length requirements at Greenlee County Airport.

The existing Runway 07-25 is 4,977 feet long (per Stantec, August 2000 survey) and 75 feet wide. Using FAA Advisory Circular 150/5300-13's FAA Runway Length model, key airport and runway data are compiled to determine existing runway needs. The FAA Airport Design Model is used in the runway length analysis. **Table 4-1** summarizes the output of the FAA model.

Table 4-1 FAA Airport Design Model for Greenlee County Airport

AIRPORT AND RUNWAY DATA	
Airport elevation	3,797 feet
Mean daily maximum temperature of the hottest month	101.00 F.
Maximum difference in runway centerline elevation	75 feet
Length of haul for airplanes of more than 60,000 pounds	500 miles
Dry runways	
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with approach speeds of less than 30 knots	410 feet
Small airplanes with approach speeds of less than 50 knots	1,100 feet
SMALL AIRPLANES WITH LESS THAN 10 PASSENGER SEATS	
75 PERCENT OF THESE SMALL AIRPLANES	4,070 feet
95 percent of these small airplanes	**5,280 feet**
100 PERCENT OF THESE SMALL AIRPLANES	5,640 feet
Small airplanes with 10 or more passenger seats	5,640 feet
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	7,160 feet
75 percent of these large airplanes at 90 percent useful load	9,340 feet
100 percent of these large airplanes at 60 percent useful load	10,580 feet
100 percent of these large airplanes at 90 percent useful load	11,740 feet
Airplanes of more than 60,000 pounds . . . . . Approximately	6,350 feet

REFERENCE: Chapter 2 of AC 150/5325-4A, Runway Length Requirements for Airport Design, no changes included.

As shown, the existing runway length accommodates 75 percent of small airplanes (under 12,500 pounds or less maximum certified takeoff weight), but less than 95 percent utilizing the airport during summertime operations. In order to accommodate most B-II aircraft and establish the most flexible airport development, it is recommended that Runway 07-25 be extended a minimal of 303 feet. Based on the FAA model, the length of **5,280** feet will accommodate **95 percent** of small aircraft and allow some larger aircraft to operate at Greenlee County Airport.

It is notable, when the airport reaches large aircraft (C-II or larger) operations exceed 500 or more in one year, the runway length to accommodate those operations increases to 7,160 feet. However, the assumption was made that small B-II aircraft operations will continue to be the majority of the activities at the airport throughout the planning period.

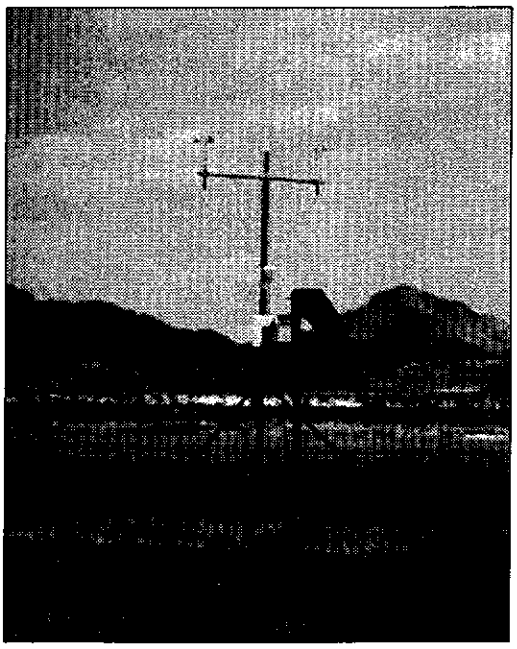
According to AC 150/5300-13 change 6, the existing runway width of 75 feet meets the required width for a B-II visual runway (and non-precision runway with not lower than ¾ statute mile approach visibility minimums). This width is adequate for Runway 07-25 during the planning period.

Runway Protection Zones (RPZs)

The majority of the Runway Protections Zones for Runway 7-25 are controlled by the County. Runway 7 end's RPZ is controlled under a "clear zone easement" with two small portions/parcels of the RPZ sides located outside of the easement. The existing easement should be expanded to include these two parcels. Runway 25 end's RPZ is full contained on airport property. The RPZs (1,000 x 500 x 700 feet) for both runway ends are consistent with visual approaches as well as instrument approaches of not less than one-mile visibility for aircraft approach category A & B. The RPZ sizes will not change within the planning period. However, a runway extension to either end of Runway 7-25 will shift its corresponding RPZ and require the acquisition of an avigation easement.

Runway Safety Area (RSA)

The current FAA design criteria for Runway Safety Areas require 150 feet in width and 300 feet off each runway end for B-II runways. The airport currently has 300 feet off each runway and is adequate within the planning period. However, there have been indications from pilots, as well as ADOT inspections in 1999, that brush and other natural debris are present inside the RSA. We recommend that continual maintenance be conducted to clear debris within the RSA.



Runway Wind Coverage and Orientation
The FAA has established guidelines indicating that an airport runway system should provide 95 percent usability of the runway (where prevailing winds are consistently from one direction, runways are generally oriented in that direction). Due to lack of recent historical wind information for Greenlee County Airport,

the Arizona Department of Transportation, Aeronautics Division placed a wind recorder at the airport for a period of one year (2000).

The current wind data results taken from April 22 through December 1, 2000 indicate that the existing Runway 07-25 provides 95.75 percent wind coverage at 10.5 knots (12 mph) and over 98 percent coverage at 13 knots (15 mph). Based on these coverages, there are no indications that the existing runway needs realignment and/or that a secondary/crosswind runway is needed. However, ADOT's wind information represents less than one year and FAA recommends wind data be collected for 10 years or more for reliability. Therefore, when equipment is available, it is recommended that the wind data collection continue for additional years.

Runway Gradient
The airport elevation is 3,797 feet above mean sea level (MSL) and effective runway gradient for Runway 07-25 is 1.5 percent. The gradient does not exceed (1.5%) FAA design criteria and is adequate through the planning period.

Runway Pavement Strength
The existing pavement strength of Runway 07-25 is 24,000 pounds SWL (per engineering records), which will accommodate both small aircraft and some large aircraft. Therefore, the existing pavement strength at Greenlee County Airport is adequate through the planning period. While the current runway pavement strength can accommodate the operations at Greenlee County Airport within the 20-year planning period, a pavement maintenance program is recommended.

Taxiways
There are two (2) exit taxiways off of Runway 7-25 – one located west of the parking apron (T1) and the other (T2) located as part of the secondary apron. The exits are 40 feet wide, more than 750 feet apart, and between 140 feet (T1) and 170 feet (T2) in length.

Both runway exits meet FAA design criteria, accommodating airplane Design Group II at least 35 feet (AC 150/5300-13, chg. 4) in width. Both runway exit pavements have recently been overlaid and should be maintained as part of the airfield pavement maintenance program established by FAA standards. The existing pavement strength of 24,000 pounds SWL is adequate through the planning period.

Parallel Taxiway Option
There is no parallel taxiway to Runway 07-25 at Greenlee County Airport. According to FAA design criteria, "a basic airport consists of a runway with a full length parallel taxiway, an apron and connecting transverse taxiways between the runway, parallel taxiway and the apron" (AC 150/5300-13 CHG 4, pg. 33). Although the low number of aircraft operations and more than adequate airfield capacity offer little justification for a parallel taxiway, FAA and ADOT Aeronautics support the construction of parallel taxiway systems at B-II airports. However, Greenlee County may opt to delay the investment in this improvement until higher-need improvements are completed since other airports similar to Greenlee County have operated without a parallel taxiway until annual operations reached 15,000 to 20,000.

Helipad
Safe separation of fixed wing aircraft and helicopter traffic has been a PAC-identified issue for the airport. However, the low level of helicopter traffic does not justify the cost of helipad construction in the planning period. Therefore, this operational issue should be managed with locally published airport operating procedures.

Airfield Lighting
The current runway lighting is a Medium Intensity Runway Lighting (MIRL) system with radio transmitter control activated by pilots is adequate within the planning period. However, it is recommended that Precisions Approach Path Indicators (PAPIs) be installed at each runway end to provide a three-degree glide slope.

New reflective markers at each runway exit improve safety of nighttime aircraft movements on the airport and help eliminate inadvertent taxiing off paved surfaces. Existing reflectors are adequate within the planning period. However, a medium intensity taxiway lighting (MITL) system should be considered in association with any partial or full-length taxiway system development.

Rotating Beacon and Wind Cone
The airport is equipped with a newly installed pole-mounted six-inch rotating beacon that is in accordance to FAA design standards and adequate through the planning period. This beacon is located near the new electrical vault and terminal building. The new beacon replaced the airport's old beacon that was located east of he apron. There is also a standard wind cone with a light on the north side of Runway 7-25 east of the caretaker's residence. The wind cone is fully functional and adequate through the planning period. There are two additional wind cones that are unlighted, which are located near the east and west ends of the airfield – one adjacent to Runway 07 and the other adjacent to the Runway 25 end.

Airfield Markings
The airfield was restriped and marked in 2000 with the exception of aircraft tiedown areas. According to FAA AC 150/5340-1E, airfield and aircraft parking areas are marked adequately within the planning period.

Navigational Aids
The Greenlee County Airport currently does not have any terminal navigational aids. According to users and the airport facility directory, the Silver City VHF Omnidirectional/Tactical Air Navigation Station (VORTAC) is available.

The option of an NDB (non-directional beacon) could eliminate weak and lost signals from the Silver City VORTAC. However, due to lack of future NDB funding support from ADOT and the FAA, it is recommended that the County install a GPS system, after further evaluation and when economically feasible.

According to ADOT's 1999 Navigational Aids and Aviation Services Special Study, a GPS 7 with 1¼-mile visibility minimums was initially analyzed for potential installation at Greenlee County Airport. The study established that an initial GPS required a 15 degree offset alignment to avoid Guthrie Mountain and 180 degree turn to the right in missed approach to avoid highest terrain (Table 5-3, pg. 5-31). The final GPS analysis in the study does indicate that Greenlee County Airport meets the desired level of applicable standards for the GPS system and can be economically justified (pg.5-72).

Airspace and Traffic Pattern
Airspace reservations for the airport are described by FAA Order 7480.1A, "Guidelines for Airport Spacing and Traffic Pattern Airspace Areas." According to future activity estimates at Greenlee County Airport, there will be no significant increase in airspace needed unless a non-precision straight-in or precision instrument approach is installed at the airport during the planning period.

Although Greenlee County is located within a military operations area (MOA), such operations are not expected to significantly impact the airport's airspace capacity and have no apparent airspace conflicts to neighboring airports.

The current traffic pattern at Greenlee County is a standard left-hand pattern for uncontrolled airports. The nominal forecasts indicate an uncontrolled airfield will be adequate through the twenty-year planning period.

There are indications of power poles that penetrate the conical surface (7:1 slope). These lines provide power to the caretaker's home and the electrical vault. It is recommended that the poles be surveyed for height and appropriate FAA Form 7460-1 applications (see Appendix D) be submitted for further evaluation. Other buildings in the area should also be surveyed to determine whether they are obstructions and to what extent they penetrate the transitional surface. These surveys and 7460-1 applications should be included with other ongoing or upcoming engineering projects.

Landside Requirements

The purpose of this section is to determine the space requirements during the planning period for the following components of the general aviation landside types of facilities:

- Hangars
- Aircraft Parking Apron
- Terminal Building
- Fixed Based Operator (FBO)
- Fueling Facilities
- Auto Parking
- Airport Access
- Aircraft Rescue & Firefighting Facilities (ARFF)
- Utilities
- Air Traffic Control Tower (ATCT)
- Security and Fencing
- Airport Maintenance
- AWOS
- Land Acquisition and Control

The capacities and capabilities of the various components of the existing terminal area are examined in relation to projected demand to identify future landside facility needs.

Aircraft Hangars

The demand for hangar facilities is dependent upon the number and types of aircraft expected to be based at the airport. Actual percentages of based aircraft desiring hangar facilities will vary across the country as a function of local climatic conditions, airport security, and owner preferences. This percentage will also vary with value and sophistication of the aircraft and will typically range anywhere from 20 to 80 percent of based aircraft. Hangar facilities are generally classified as conventional hangars, T-hangars, or shades. These different types of hangar facilities offer varying degrees of privacy, security, and protection from the elements.

There were two existing privately owned hangar facilities to house the two based aircraft at Greenlee County when the master planning effort began. However, one of the two based aircraft recently relocated and its associated hangar was removed. Due to the mild climate in the Greenlee County area and the low aviation activity, no additional hangar development demand is anticipated during the planning period. However, development alternatives in the next chapter will present general aviation land use/development areas

to accommodate additional hangar or t-shade development as part of the long-term planning process.

Aircraft Parking Apron

Adequate aircraft parking apron should be provided to accommodate those local aircraft not stored in hangars as well as all transient aircraft under most conditions. At Greenlee County Airport, apron and tiedowns for both local and transient aircraft are co-located on the existing main apron.

Aircraft parking area requirements are based on 360 square yards per aircraft. This area is defined for Airport Design Groups I and II, Approach Categories A & B. Since Greenlee County's existing apron area totals 9,360 square yards, no additional aircraft parking will be required through the planning period (see **Table 4-2).**

Table 4-2 Aircraft Parking Area Requirements

Based/Transient Parking	**2000**	**2005**	**2010**	**2020**
Based Aircraft	2	2	2	2
Transient Aircraft (50% park all day)*	5	5	6	6
TOTAL Aircraft	**7**	**7**	**8**	**8**
TOTAL Apron Required**	**5,580 surplus**	**5,580 surplus**	**5,040 surplus**	**5,040 surplus**

**Transient aircraft conduct 90% of total peak hour operations and 50% of those aircraft park all day*

***Calculated @ 360 s.y. per aircraft + 50% circulation, less existing 9,360 s.y. (existing)*

Since the existing apron accommodates 25 spaces, the apron area capacity will be adequate through the planning period. However, crack sealing is needed on the apron.

Terminal Building

Although Terminal space requirements are usually based on a square footage per passenger basis, certain minimum facilities should be provided regardless of passenger volume. The methodology utilized to examine Terminal Building needs generally uses design hour pilot/passenger levels. Space requirements were determined using 250 square feet per design hour pilot and passenger. **Table 4-3** outlines the terminal space requirements for a terminal building at Greenlee County Airport during the planning period. Due to the small number of users, the existing 800 square-foot terminal building is adequate within planning period.

Table 4-3 Terminal Space Requirements

	Demand			
	2000	**2005**	**2010**	**2020**
Peak (Design) Hour (Pilot/Passengers)	2	2	2	3
Calculated Terminal Bldg. by Design Hour Passengers (250 S.F.)	500	500	500	750
Total Terminal Bldg. Area (800s.f.)	300 surplus	300 surplus	300 surplus	50 surplus

Fixed Based Operator (FBO)

Due to the existing and projected low levels of aviation activity, there are no plans for fixed based operator (FBO) services at Greenlee County Airport. However, when activity levels increase, services can be provided at the airport. Possible future FBO services could

include airport staffing, aircraft maintenance, flight instruction, ground transportation to/from town, and aircraft fueling. An FBO could also assist in tracking aircraft operations to provide the airport with a better estimate of total annual operations by aircraft type and possibly user category. The county should research similar airports in relation to their successes and failures in relation to FBOs (Benson and H. A. Clark –Williams would be good examples to start with)

Fueling Facilities

Greenlee County Airport does not have an existing fuel facility. Due to the airport's relative distance from other neighboring airports with fuel service, consideration has been given to forecasting local aviation gas demand. Based on past experience with other rural airports in the state, the average fuel consumption per operation is estimated at 10 gallons. Assuming that operational consumption remains constant, fuel requirements can be forecast by week from activity projections as shown in **Table 4-4**.

Table 4-4 Fuel Requirements

Year	Annual Operations	Weekly Fuel Usage (gallons)
2000	6726	1,293
2005	7070	1,360
2010	7430	1,429
2020	8210	1,579

Due to the projected low volume of fuel usage shown here as well as the limited transient fuel needs at Greenlee County Airport, fueling facilities will not be required within the twenty-year planning period. There are airports within a 50-mile radius that can handle present and future fuel needs of Greenlee County Airport. The closest airport is Safford Regional Airport located approximately 22 nautical miles west of the Greenlee County airport. Although self-service fueling is an option for Greenlee County, the estimated cost of $50,000 compared to the associated low revenue anticipated does not represent adequate justification for such an investment during the planning period.

Auto Parking

The requirements for short-term (daily) public vehicle parking may also be determined as a function of the design hour pilots and passengers. The total number of parking positions needed is projected on the basis of 1.3 spaces per design hour passenger and 350 square feet per parking space. The auto parking forecast for Greenlee County Airport is summarized in **Table 4-5**.

Table 4-5 Auto Parking Requirements

	2000	2005	2010	2020
Design Hour (Pilot/Passenger)	2	2	2	3
Auto Parking Demand (x 1.3)	3	3	3	4
Auto Parking Demand in square feet	910	910	910	1,365
TOTAL Auto Parking (37 existing spaces)	34 surplus	34 surplus	34 surplus	33 surplus

The table identifies parking demand through 2020. Presently, there are up to 37 parking spaces available. There will be no further plans for additional parking. However, continued maintenance of the auto parking area is recommended within the planning period.

Airport Access and Ground Transportation
The entrance road is located off of State Route 78 and the County constructed the relocated entrance (approximately ¼ mile portion) in 1999. The asphalt-paved access road extends over ¾ of a mile long and 24 feet in width from State Route 78 to the airport.

The existing road is well maintained and accommodates local traffic and airport traffic without safety concerns. However, signs directing vehicles to the airport from the Clifton and Morenci communities are inadequate. It is recommended that additional signs be posted within the Towns of Clifton and Morenci to the airport.

Ground transportation is currently unavailable between the airport and the local communities of Clifton and Morenci. Providing such transportation would require a courtesy vehicle for transient airport users or an agreement between the County and a third party to provide on-call transportation. Both a courtesy vehicle and an agreement would require that liability to be assumed by the County. Since there are no existing transportation operations to subsidize in relation to their being on call to provide services to the airport, a new service would need to be developed. A user study would need to be performed to evaluate demand and willingness to pay, it is unlikely that this service would be viable at this time.

Aircraft Rescue and Firefighting Facilities (ARFF)
Since there is no history or future anticipated scheduled air service for Greenlee County Airport, an on-airport ARFF facility is not required during the planning period. According to staff, the Morenci Fire Department provides rescue and firefighting services with a response time of 25 minutes. Although this airport is not required to comply with specific response times identified in Part 139; it is recommended that Greenlee County Airport work towards reducing emergency response time to five minutes. The Greenlee County Fire Department and local Hospital facilities in the Town of Morenci are adequate to meet operational requirements through 2020.

Utilities
The existing natural drainage on the airport runs from the Northeast to the Southwest through the runway midpoint that enables runoff North of the runway to be channeled to the South. Although a small culvert has been installed at Runway Exit (T1) and a berm the length of the access road, additional culverts, specifically at Runway Exit (T2) will be needed to prevent the existing ponding around the area and protect the integrity of pavement and asphalt throughout the airfield. It is also recommended that a comprehensive Drainage Study also be conducted to provide alternatives for future maintenance of the airfield.

Duncan Valley provides the electric at Greenlee County Airport. Electric service is supplied via overhead lines, which parallel the airport access road. Power requirements for the airport were upgraded with the newly built Terminal building. The electrical requirements are adequate within the planning period.

Copper Valley Telephone Company supplies the telephone service at Greenlee County Airport. Additional telephone lines may be added as other facilities are built, however, the existing lines are adequate within the planning period.

There are currently no sewage facilities at the airport. There are three (3) septic tanks for the Old Restrooms, Caretaker's Residence, Civil Air Patrol trailer, New Terminal Building, and Juvenile Detention Facility. No additional tanks are needed within the planning period.

There is a 500-gallon propane tank located by the new terminal building for heating. The tank is serviced on an as-needed basis and is adequate through the planning period.

Air Traffic Control Tower (ATCT)
According to the Airways Planning Standard Number 1 (APS-1) for establishment of a control tower, an airport becomes eligible for an FAA tower when annual operations reach 200,000. Greenlee County Airport's forecast of 9,059 annual operations in 2020 precludes the installation of a FAA-funded control tower within the planning period. While safety and cost/benefit considerations make a contracted tower (privately owned) a viable option for some airports, this is not an option for Greenlee County.

Security and Fencing
The perimeter fencing completely encloses the airport boundary and does not penetrate any surfaces in the Part 77 airspace. However, airport users have indicated that the current perimeter fencing is inadequate to prevent wildlife from accessing the airfield. New game fencing (additional height) and additional warning signs are recommended to improve incursion safety and enhance overall airport and airplane security. In addition, it is recommended that Greenlee County and other appropriate agencies establish policies to address safety and security issues at the airport due to non-aviation related public uses located within airport property boundaries.

Recent events have suggested that all airports address security issues at and around their airports and include possible improvements in their capital improvement program. Security fencing and access should be addressed at Greenlee County Airport.

Facility Requirements for Contingency Development

This section provides a cursory review of facility needs associated with contingency development. For Greenlee County Airport, this specifically addresses the potential Federal Prison development. As discussed earlier in the Contingency Demand section of Chapter 3, Forecasts, several assumptions regarding the development of a Federal Prison facility were identified, in coordination with the County, to help determine what this means in terms of airport demand and development.

The initial factors to be considered are aircraft type and operations demand, as previously identified in Chapter 3, and expanded below. Subsequently, airside and landside facility requirements are identified, which meet demand and follow specific FAA design standards and planning guidelines.

Aircraft Type and Operations
It is anticipated that the Boeing 727-200 aircraft will be used for Federal Prison operations. Pertinent aircraft characteristics include:

Aircraft Approach Category and Design Group = C-III
Approach Speed = 138 knots (159 mph)
Cruising Speed = 495 knots (570 mph)
Max. Takeoff Weight (lbs.) = 209,500
Wingspan = 108 feet
Length = 153 feet
Passenger load = up to 189

For planning purposes, the Boeing 727-200 aircraft is assumed to arrive twice weekly with typically 40-60 prisoners plus a three-member aircraft crew and five to seven Federal Prison System employees for a total of up to 70 people. While the aircraft will not be based at Greenlee County, aircraft parking should be available for an estimated four hours. Further, it is estimated that Federal Prison facility cargo totaling an average of two to three tons will accompany each flight.

Contingency Airside Requirements
Design Standards

Greenlee County is a B-I facility that primarily accommodates small GA operations, which generally includes aircraft with slow approach speeds and small wingspans. However, if the contingency demand and development associated with the Federal Prison is realized, the airport will experience operations by a much faster and wider aircraft. This typically changes the airport geometric design standards. In other words, facility dimensions and separation requirements increase. Since this can be quite costly for an airport and typically requires funding assistance, most airports upgrade their airport only after the aircraft commences operations on a "regular basis." The term "regular basis" has typically been defined as 500 or more annual operations. While the 727-200 may operate on a twice-weekly basis, this will only translate to approximately 200 operations annually – less than half of the 500-operations threshold. However, there are certain facilities and separations distances that must be provided before a large aircraft operator will utilize a facility.

Table 4-6 presents a summary of all pertinent airport design standards to accommodate the Boeing 727-200 operations. The next chapter will address the alternative possibilities for accommodating all or a portion of these design standards on the airport.

Table 4-6 Airport Design Standards and Separations

Airfield Element	C-III Standards (in feet)
Runway Length during the hottest month (July) (100% large aircraft @ 60 percent useful load)	10,580
Runway Width	100
Runway Safety Area (RSA) width and length	500 X 1,000
Runway Object Free Area (ROFA) width and length	800 x 1,000
Runway Protection Zones for Visual and not lower than one mile	1,700 x 500 x 1,010
Taxiway Width	50
Taxiway Safety Area Width	118
Taxiway Object Free Area Width	186
Runway Centerline* to:	
Taxiway /Taxilane centerline	400
Aircraft Parking Area (Apron)	500
Helicopter landing pad (12,000lbs or less)	500

*Separation Standards with runways not lower than ¾ statute mail approach visibility minimums
Source: AC 150/5300-13 Chg. 6, *Airport Design* and AC 150/5390-2A, *Heliport Design*.

Runway

At 4,977 x 75 feet, the existing Greenlee County runway length cannot accommodate 727 operations; this length generally limits passenger-carrying aircraft (based on current aircraft technology and performance) to 10 seats or less. According to Boeing's *Airplane Characteristics for Airport Planning*[1], the ultimate runway length for Boeing 727 operations should be 8,700 feet. Therefore, the Federal Prison aircraft operations will require a longer runway. The next chapter addresses the alternatives for meeting this requirement to include the County and PAC's desire to ultimately construct a new secondary runway.

Taxiways

Twice-weekly flights are considered low activity levels and do not justify the expense of a full-length parallel taxiway. However, it is recommended that holding aprons be provided at each runway end and along with exit taxiways at appropriate runway locations based on physical airfield configuration (to be identified in Chapter 5).

Contingency Landside Requirements

Aircraft Parking Area

An apron area for the Boeing 727 should include parking and circulation. It is anticipated that only one 727 will be on the ground simultaneously. Therefore, a total of 85,000 square feet is needed. This will accommodate the aircraft parking space, limited cargo staging, secured prisoner enplaning and deplaning, and circulation.

[1] REFERENCE: Boeing 727 *Airplane Characteristics—Airport Planning* D6-58324 Rev C, April 1985, pg. 29; Boeing 737-100, D6-58325 Rev D, October 1988,pg.50.

Terminal Building
Terminal building requirements at airports are typically based on peaking characteristics for passengers, aircraft crew, and other terminal users. However, the contingency passenger demand described for Greenlee County is unique. The passengers will be enplaned and deplaned in a federally controlled manner consistent with Federal Prison system requirements. Further, the Federal Prison facility will serve as the primary "terminal facility" for the passengers. Thus, the design hour terminal building requirements for this contingency development are primarily calculated using Federal Prison crew and security personnel estimates, which are estimated to total up to 10 per flight. Using the 250-square-feet-per-passenger planning estimate, this translates to a need for 2,500 square feet of terminal space. Since the existing terminal building totals 800 square feet and other transient and based aircraft operators will use the facility, the terminal will require expansion as part of the contingency development effort.

Security
Meeting the security needs will require the involvement of Greenlee County Public Works, Federal Prison System staff, FAA, Police, Security services, labor unions, and government departments. The following briefly summarizes the security issues and procedures to be addressed:

- Fencing must provide multiple functions: (1) clearly define the protected areas, (2) deter intruders, (3) delay or inhibit unlawful entry, and (4) provide defined controlled access points at gates.

- Measures, such as the identification of prison-affiliated persons and vehicles, must also be used to secure the airport and its users from potential terrorist or harmful individuals. Clear and distinct uniforms or form of identification must be established.

- Aircraft isolation area should be designated on the airfield in the event of sabotage. FAA regulations mandate at least 328 ft. from any other aircraft parking, building, public areas or utilities.

Auto Parking
A total of 7,000 square feet of additional parking area is necessary to support this contingency development. This area, calculated using 350 square feet per automobile, assumes parking demand for up to 20 Federal Prison employees and visitors.

Crash, Fire and Rescue
In the event that Boeing 727 operations commence, Greenlee County Airport will be required to comply with FAR Part 139 ARFF requirements for aircraft rescue and firefighting response. Part 139 states that a lightweight vehicle must be able to reach a midpoint of the farthest runway from its assigned post within three minutes from the time the alarm is sounded. The second vehicle must be able to fulfill the same requirements in four minutes and any subsequent vehicle in 4½ minutes. Although the local firefighters cannot currently respond within the required three minutes in an on-call scenario, they can respond in advance of a scheduled arrival or departure flight on stand-by to meet the Part 139 response requirements. However, specific ARFF equipment is required prior to commencing 727 operations. The Fire Department is not currently equipped to meet these requirements.

Fuel Storage
Since the Boeing 727-200 can take approximately 50,000 lbs. of fuel (for a range of 2,840 miles[2]), on-airport fuel storage to support these operations should be considered. However, it is recognized that the Federal Prison System flights may use other enroute destinations for such support once operations commence. Chapter 5 identifies a fuel storage location for this contingency development.

Utilities
As the need for more buildings and facilities are developed and actual planning and design is refined, additional utility requirements will inherently be identified.

Summary

This chapter has examined the airport's ability to accommodate existing and forecast aviation activity. As a result, several facility deficiencies have been identified at the airport. The existing deficiencies will become more prominent in the future as activity at the airport increases. Therefore, measures must be taken to alleviate these deficiencies and accommodate future aviation activity.

The required development presented in **Table 4-8** will not only improve or correct existing deficiencies, but also provide the modern and efficient facilities necessary to attract and encourage additional development and services. The next step in the master planning process is to analyze various alternatives capable of providing the necessary facilities. Chapter Five will examine several alternatives, assess their relative strengths and weaknesses, and recommend a development plan for the future of Greenlee County Airport.

[2] *Aviation Week and Space Technology, January 17,2000*

Table 4-8 Summary Facility Requirements

Description	Requirements
Runway 07-25 @ 4,977 feet long	Adequate
Wind Coverage	Additional wind information (up to 5 to 10 years) recommended
Taxiways (Runway exits)	Adequate in width and strength
Aircraft Parking	Adequate capacity through the planning period, recommend crack sealing
Lighting and Visual Aids	Adequate. Recommended installation of PAPIs due to surrounding terrain
Airport Markings	Adequate with exception of existing tiedown area
Navigational Aids	Recommend installation of GPS to eliminate weak or lost signals
Airspace	Adequate
Runway Protection Zones/Safety Area	Adequate
Fueling Facilities	None
Terminal Building	Adequate
Fixed Based Operator (FBO)	None
Auto Parking	Adequate
Surface and Airport Access	Adequate. Recommend additional directional airport signs will be needed from local town to the airport.
Drainage	Recommend additional culverts and Drainage Study
ARFF- Firefighting and Crash Rescue Facilities	None
Utilities	Adequate
Air Traffic Control	Low forecast operations precludes the airport from FAA supported ATC facilities
Security and Fencing	Recommend new game fencing for height and additional warning signs. Policy recommendation for Greenlee County and other appropriate agencies establish procedures to address incursion safety and airport/airplane security issues at the airport due to non-aviation use of facilities within the airport property.
Land Use	Recommend establishment of Airport Influence Area (AIA) by the County
Other Facilities	See Contingency Development section